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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.       | CONFIRMATION NO.  |
|---|-------------|----------------------|---------------------------|-------------------|
| 09/629,204  | 07/31/2000  | Kamran Uz Zaman      | 690-009312-US(PAR)D/99836 | 5766              |
| 7590  | 01/10/2005  |                      | EXAMINER                  |                   |
| Kevin P Correll<br>Perman & Green LLP<br>425 Post Road<br>Fairfield, CT 06430 |             |                      |                           | KAO, CHIH CHENG G |
|   |             | ART UNIT             |                           | PAPER NUMBER      |
|   |             | 2882                 |                           |                   |

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 09/629,204             | ZAMAN ET AL.        |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Chih-Cheng Glen Kao    | 2882                |  |

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 10 December 2004.  
 2a) This action is FINAL.                                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-27 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-27 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 23 July 2004 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

### ***Requirement for Information***

2. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

In response to this requirement, please provide the title, citation, and copy of each publication that is a source used for the description of the prior art in the disclosure (i.e. existing automatic visual inspection (AVI) systems inspecting for defects within the image area of an OPC). For each publication, please provide a concise explanation of that publication's contribution to the description of the prior art.

In response to this requirement, please provide the title, citation, and copy of each publication that any of the applicants relied upon to develop the disclosed subject matter that describes the applicant's invention, particularly as to developing the method steps shown in the original drawings of Figures 2-4 for a "semi-conductor". For each publication, please provide a concise explanation of the reliance placed on that publication in the development of the disclosed subject matter.

In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant's disclosure.

The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained will be accepted as a complete reply to the requirement for that item.

This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

***Drawings***

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following not mentioned in the description: “semi-conductor” recited numerous times in Figures 2-4. This objection may be obviated by replacing each instance of “semi-conductor” with - -OPC- -. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 4, 6, 8, 9, 11-13, 18, 20, and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. (US Patent 5352329) in view of Ono et al. (JP 03291552), Brown et al. (US Patent 5157463), and Bose et al. (US Patent 5040228).

5. Regarding claims 1 and 24-26, Herbert et al. teaches a system and method for inspecting OPC bottom edge wipe defects and classifying (col. 1 to col. 2, line 11).

However, Herbert et al. does not explicitly disclose a system or method for optically inspecting photoconductors with at least one optical sensor camera providing a band of captured illumination with gray level picture data of a plurality of distinguishable pixels which are darker and lighter, and a controller for determining a ratio of a number of distinguishable pixels to a total number of pixels in the band, the controller comprising a threshold detector for sensing defects.

Ono et al. teaches a system and method for inspecting photoconductors (Abstract, “drum 3”) with at least one optical sensor (Abstract, “photodetector 2”) and an illumination source (Abstract, “laser light 4”). Brown et al. teaches at least one optical sensor camera (Fig. 2, #16) providing a band of captured illumination with gray level picture data of a plurality of distinguishable pixels which are darker and lighter (col. 3, line 67, to col. 4, line 6), and a controller for determining a ratio of a number of distinguishable pixels to a total number of pixels in the band, the controller comprising a threshold detector for sensing defects of a different subject (col. 3, lines 55-66, and col. 6, lines 1-10). Bose et al. teaches inspecting for defects of different subjects (col. 1, lines 13-15 and 19-23).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system and method of Herbert et al. with the optical system and method of Ono et al., since one would be motivated to make such a modification to increase accuracy for detecting defects (Abstract, Purpose) as implied from Ono et al.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system and method of Herbert et al. as modified above with the camera and controller of Brown et al., since one would be motivated to make such a modification to better inspect for quality (col. 1, line 8) as implied from Brown et al.

It would also have been obvious, to one having ordinary skill in the art at the time the invention was made, to make the modifications to the system and method of Herbert et al., which is explained with motivation as follows. Automated visual inspection is widely used in industry for different types of articles. A vision processor is programmed to examine certain attributes of a captured image of an article in order to detect a defect, such as the presence or absence of a particular feature (col. 1, lines 12-23) as shown by Bose et al. Since such articles are considered art-recognized equivalents in that they are all articles that can be imaged by a photodetector for inspection of defects, one of ordinary skill in the art would have found it obvious to substitute different articles and make the corresponding modifications to look for a particular feature and to detect a defect as implied from Bose et al. Therefore, one having ordinary skill in the art at the time the invention was made, would have found the modifications to the system and method of Hebert et al. to be obvious, and one would be motivated to make such modifications to automate and speed up inspection (col. 1, lines 14-15) as implied from Bose et al.

6. Regarding claims 11, 20, and 27, Herbert et al. as modified above suggests a method as recited above.

However, Herbert et al. does not explicitly disclose illuminating, capturing illumination, processing data, and classifying based upon a comparison of the captured reflected illumination with a threshold level to compare to a predetermined ratio.

Brown et al. further teaches illuminating (Fig. 2, #13), capturing illumination (Fig. 2, #16), processing data (Fig. 2, #17), and classifying based upon a comparison of the captured reflected illumination with a threshold level to compare to a predetermined ratio (col. 3, lines 60-66).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the method of Herbert et al. as modified above with the illuminating, capturing, processing, and classifying of Brown et al., since one would be motivated to make such modifications to better inspect for quality (col. 1, line 8) as implied from Brown et al.

7. Regarding claims 4 and 12, Herbert et al. as modified above suggests a system and method as recited above.

However, Herbert et al. does not explicitly disclose an emitter emitting electromagnetic radiation of at least one wavelength due to characteristics of light.

Brown et al. further teaches an emitter (Fig. 2, #13), which would necessarily emit electromagnetic radiation of at least one wavelength due to characteristics of light.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the system and method of Herbert et al. as modified

above with the emitter of Brown et al., since one would be motivated to make such a modification to better inspect for quality (col. 1, line 8) as implied from Brown et al.

8. Regarding claim 6, Herbert et al. as modified above suggests a system as recited above.

However, Herbert et al. does not explicitly disclose a data storage area useable to store predetermined threshold values and classification results.

Brown et al. further teaches a data storage area useable to store predetermined threshold values and classification results (Figs. 1 and 2, #17).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the system of Herbert et al. as modified above with the data storage of Brown et al., since one would be motivated to make such a modification to more easily inspect for quality (col. 1, line 8, and Fig. 1, #17) as implied from Brown et al.

9. Regarding claims 8 and 9, Herbert et al. as modified above suggests a system as recited above.

However, Herbert et al. does not explicitly disclose a visual display monitoring device for alerting a user.

Brown et al. further teaches a visual display monitoring device for alerting a user (Figs. 1 and 2, #19).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the system of Herbert et al. as modified above with the monitoring device of Brown et al., since one would be motivated to make such a

modification to more easily inspect for quality (col. 1, line 8, and Fig. 1, #19) as implied from Brown et al.

10. Regarding claim 13, Herbert et al. as modified above suggest a method as recited above. However, Herbert et al. does not explicitly disclose digitizing the reflected illumination. Brown et al. would necessarily digitize the reflected illumination (Fig. 3, #69, and Fig. 1, #17) so one can process signals on a computer.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the method of Herbert et al. as modified above with the digitizing of Brown et al., since one would be motivated to make such a modification to more easily inspect for quality (col. 1, line 8, Fig. 1, #17) as implied from Brown et al.

11. Regarding claim 18, Herbert et al. would necessarily classify as acceptable or non-acceptable (col. 2, lines 3-6), in order to determine if further hand wiping is needed.

12. Claims 2, 3, 5, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as respectively applied to claims 1 and 20 above, and further in view of Roy et al. (US Patent 6118540).

Herbert et al. as modified above suggests a method and system as recited above. However, Herbert et al. does not disclose a light emitting diode (LED), laser, visible light source, or CCD camera.

Roy et al. teaches an LED (col. 2, line 53), laser (col. 2, lines 60-64), visible light source (col. 2, lines 51-53), or CCD camera (col. 2, lines 38).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method and system of Herbert et al. as modified above with the LED, laser, visible light source, or CCD of Roy et al., since one would be motivated to make such modifications to better perform computer vision analysis with a single camera (col. 2, lines 46-49) as implied by Roy et al.

13. Claims 7, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as respectively applied to claims 1 and 11 above, and further in view of Brown et al. (US Patent 5118193).

For purposes of being concise, Herbert et al. as modified above suggests a system and method as recited above.

However, Herbert et al. does not disclose a threshold detector comprising an array of pixels and a pixel counter.

Brown et al. ('193) teaches a threshold detector comprising an array of pixels (Fig. 4) and a gray pixel counter (col. 4, lines 5-9).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the system of Herbert et al. as modified above with the pixel counter for the array of pixels of Brown et al. ('193), since one would be motivated to make such a modification to better analyze the significance of defects over an entire part and see if the

subject meets quality control guidelines (col. 1, lines 17-19, and col. 4, lines 5-12) as implied from Brown et al. ('193).

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as applied to claim 8 above, and further in view of Langley (US Patent Application Publication 2001/0012392).

Herbert et al. as modified above suggests a system as recited above.

However, Herbert et al. does not disclose an audio monitor.

Langley teaches an audio monitor (Page 2, Paragraph 24).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to modify the system of Herbert et al. as modified above with the audio monitor of Langley, since one would be motivated to make such a modification to more easily warn the user of defects (Page 2, Paragraph 24) as implied from Langley.

15. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as applied to claim 11 above, and further in view of Lindow et al. (US Patent 4748335).

Herbert et al. as modified above suggests a method as recited above.

However, Herbert et al. does not disclose analog signals from the captured illumination.

Lindow et al. teaches analog signals from the captured illumination (col. 1, lines 20-31).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method of Herbert et al. as modified above with the

analog signals of Lindow et al., since one would be motivated to make such a modification to more easily convert signals from a camera to a output device such as a CRT (col. 1, lines 20-31) as shown by Lindow et al.

16. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as applied to claim 11 above, and further in view of Nakagawa et al. (US Patent 4148065).

Herbert et al. as modified above suggests a method as recited above.

However, Herbert et al. does not disclose comparing with a predetermined analog voltage level.

Nakagawa et al. teaches comparing with a predetermined analog voltage level (Fig. 4, #56A, and col. 5, lines 37-39).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method of Herbert et al. as modified above with the comparison of analog voltage levels of Nakagawa et al., since one would be motivated to make such a modification to make the video signal more intelligible (col. 5, lines 39-50) as implied from Nakagawa et al.

17. Claims 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbert et al. in view of Ono et al., Brown et al., and Bose et al. as applied to claim 11 above, and further in view of Wasserman (US Patent 5517235).

For purposes of being concise, Herbert et al. as modified above suggests a method as recited above.

However, Herbert et al. does not explicitly disclose classifying as quasi-acceptable.

Wasserman teaches classifying as quasi-acceptable (col. 6, lines 46-48).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method of Herbert et al. as modified above with the classifying of Wasserman, since one would be motivated to make such a modification to avoid labeling products as having defects, when those products are actually within acceptable limits (col. 6, lines 46-48) as implied from Wasserman, which will save on manufacturing costs.

*Response to Arguments*

18. Objections to the claims have been withdrawn in light of the Amendment filed 12/10/2004.

19. Applicant's arguments with respect to claims 1-27 have been considered but are moot in view of the new ground(s) of rejection.

Brown et al. still applies for its teaching of an automatic visual inspection system. Herbert et al. still applies for its teaching of inspecting for OPC bottom edge wipe defects. Ono et al. has been cited above for its teaching of inspecting surface defects on photoconductors using sensors. Bose et al. has been cited above for its teaching of using machine vision for various subjects or articles, wherein the processor is programmed based on what defect a user may be attempting to find.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER